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Data Quality Index

The data and information used in the Forest and Range 2003 Assessment use many information sources to describe current conditions and predict future trends. The online technical report, Assessment Information Systems, outlines the types and general information topics created, adapted, or adopted for the Assessment. Information comes from a variety of sources, with original research conducted by FRAP and widely available government agencies' information constituting the two largest sources of information.

The vast expanse of ecological, economic, and social context in the Assessment, and the data needed to evaluate this context, were guided by the Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests, commonly known as the "Montreal Process". FRAP then adopted or modified this list to evaluate sustainability questions most relevant to California. To provide information for the indicators, FRAP created unique information to measure the condition, relied on existing datasets that discretely provided information, or manipulated existing data to provide answers to that were not previously reported.

The Assessment Summary includes an evaluation for each indicator on the quality of available data sources. The evaluation of the data is based on the framework used by the The Heinz Center, *The State of the Nation's Ecosystems: Philosophy, Framework, and Findings* (Heinz, 2002). Three different groups of data quality are included:

● **All Required Data** Generally, these data must meet three criteria: 1) scientifically credibility; 2) provide information on a substantial majority of the resource or issue; 3) have measurements repeated at regular intervals in the future (Heinz, 2002); and 4) have more than one period of measurement.

An example of this data quality would be the USFS Pacific North West Experiment Station Forest Inventory and Analysis (FIA) published reports called Timber Resource Statistics for Resource Areas of California. These reports reflect nationwide projects authorized by federal statute. The reports reflect results of databases from statistically based field plot samples which are remeasured

at specified intervals. Other examples include FRAP's Land Cover Mapping and Monitoring Program which uses numerous data sources to generate a statewide, GIS-based data set of habitat types. The program completes mapping updates on a five year cycle.

① **Partial Data** Data are accurate but are not available at levels of thematic, geographical, or temporal specificity comparable to best available data sets; may not be in sufficient quantity or adequate form to support statewide monitoring; may be the result of a one-time evaluation effort; and/or additional processing of data is needed.

② **Additional Development** Criteria to measure indicator are not well defined and agreed upon. Available data comes mainly from unique projects.

Below is an index of the indicator data quality evolution used in the Assessment Summary.

Indicators for Status and Trends of Forest and Rangeland Resources

Biological Diversity

- ① Historical Loss of Forests and Rangelands
- ① Parcelization of Forests and Rangelands
- Area and Distribution of Habitat Types
- Conifer Forest Structural Characteristics—Size and Density
- ① Old Growth Forests
- Area and Distribution of Hardwoods
- ① Management Classification and Distribution of Habitats
- ① Population Status of Native Species
- ① Status of Endangered, Threatened, and Sensitive Flora and Fauna

Productive Capacity

- Actual and Potential Growth of Trees on Timberland
- Forest Land Available for Timber Production
- Characteristics of Timberland Growing Stock
- Timber Growth Versus Harvest Between 1984 and 1994
- Rangeland Available For Grazing
- Rangeland Grazing Capacity Compared to Use

Forest Health

- Land Management and Resource Outputs
- Metropolitan Forests and Rangelands
- Location of Range Livestock Management Activities
- Impacts from Timber Production
- Lands in Reserve Status
- Projected Loss and Alteration of Land Cover Due to Housing Development
- Projected Loss and Alteration of Hardwood Land Cover Due to Development
- Wildland Fire Threat
- Proportion of Forests and Rangelands Susceptible to Ecosystem Health Risks from Wildfire
- Proportion of Housing Units in the Wildland Urban Interface at Significant Risk from Fire
- Proportion of Conifer Forest Areas at High Risk to Pest Damage through 2015
- Identification of Emerging Pests and diseases
- Presence or Absence of Range Livestock Diseases
- Presence of High Impact Non-native Invasive Plants
- Proportion of Non-native Animal Species Relative to Total Species
- Presence of Weed Control Programs
- Trends of Air Pollution Levels Expressed in Non-attainment Days

Soil Conservation and Water Quality

- Land Use in Watersheds
- Regulatory Status of Water Quality Impairments
- Trends in Salmon Populations
- Monitoring Results of Private Timber Management Practices
- Monitoring, Watershed Assessment, and Cumulative Watershed Effects

Forests and Climate Change

- Impacts of Climate Change on Forest and Rangeland Resources
- Effects of Forests on Carbon Levels
- Trends in Green House Gas Emission Reduction
- Programs to Reduce Emissions of Greenhouse Gases

Socio-Economic Well Being

- Income and Well Being Index
- Regional Job and Wage Growth Trends
- Commodity and Non-Commodity Production and Use Trends
- Status of Water Quality, Forest Products, Range Livestock, Forest and Rangelands Energy-Related Resources, and Recreation Industries
- Timber and Rangeland Contributions to Funding Rural Infrastructure Needs

Governance

- Regulatory Jurisdictions Over Management Activities
- Level of Conflict
- Level of Cooperation, Information Sharing, and Education
- Governance Resource Investments



Montreal Process Indicators

Conservation of biological diversity

Ecosystem Diversity:

- 1) Extent of area by forest type relative to total forest area;
- 2) Extent of area by forest type and by age class or successional stage;
- 3) Extent of area by forest type in protected area categories as defined by IUCN2 or other classification systems;
- 4) Extent of areas by forest type in protected areas defined by age class or successional stage;
- 5) Fragmentation of forest types;

Species Diversity:

- 6) The number of forest dependent species;
- 7) The status (threatened, rare, vulnerable, endangered, or extinct) of forest dependent species at risk of not maintaining viable breeding populations;

Genetic Diversity:

- 8) Number of forest dependent species occupying a small portion of former range;
- 9) Population levels of representative species from diverse habitats

Maintenance of productive capacity of forest ecosystems

- 10) Area of forest land and net area of forest land available for timber production;
- 11) Total growing stock of both merchantable and non-merchantable tree species on forest land available for timber production;
- 12) The area and growing stock of plantations of native and exotic species;
- 13) Annual removal of wood products compared to the volume determined to be sustainable;
- 14) Annual removal of non-timber forest products (e.g., fur bearers, berries, mushrooms, game), compared to the level determined to be sustainable

Maintenance of forest ecosystem health and vitality

- 15) Area and percent of forest affected by processes or agents beyond the range of historic variation;
- 16) Area and percent of forest land subjected to levels of specific air pollutants or ultraviolet B that may cause negative impacts on the forest ecosystem;
- 17) Area and percent of forest land with diminished biological components indicative of changes in fundamental ecological processes or ecological continuity

Conservation and maintenance of soil and water resources

- 18) Area and percent of forest land with significant soil erosion;
- 19) Area and percent of forest land managed primarily for protective functions;
- 20) Percent of stream kilometres in forested catchments with altered stream flow and timing;
- 21) Area and percent of forest land with significantly diminished soil organic matter;
- 22) Area and percent of forest land with significant compaction resulting from human activities;
- 23) Percent of water bodies in forest areas with significant variance of biological diversity;
- 24) Percent of water bodies in forest areas with significant variation pH, dissolved oxygen, levels of chemicals, sedimentation, or temperature change;
- 25) Area and percent of forest land experiencing an accumulation of persistent toxic substances

Maintenance of forest contribution to global carbon cycles

- 26) Total forest ecosystem biomass and carbon pool, and if appropriate, by forest type, age class, and successional stages;
- 27) Contribution of forest ecosystems to the total global carbon budget, including absorption and release of carbon;
- 28) Contribution of forest products to the global carbon budget

Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies

Production and Consumption:

- 29) Value and volume of wood and wood products production, including value added through downstream processing;
- 30) Value and quantities of production of non-wood forest products;
- 31) Supply and consumption of wood and wood products, including consumption per capita;
- 32) Value of wood and non-wood products production as percentage of GDP;
- 33) Degree of recycling of forest products;
- 34) Supply and consumption/use of non-wood products;

Recreation and Tourism:

- 35) Area and percent of forest land managed for general recreation and tourism;
- 36) Number and type of facilities available for general recreation and tourism;
- 37) Number of visitor days attributed to recreation and tourism, in relation to population and forest area;

Investment in the Forest Sector:

- 38) Value of investment, including investment in forest growing, forest health and management, planted forests, wood processing, recreation and tourism;
- 39) Level of expenditure on research and development, and education;
- 40) Extension and use new and improved technologies;
- 41) Rates of return on investment;

Cultural, Social, and Spiritual Needs and Values:

- 42) Area and percent of forest land managed to protect the range of cultural, social, and spiritual needs and values;
- 43) Non-consumptive use forest values;

Employment and Community Needs:

- 44) Direct and indirect employment in the forest sector;
- 45) Average wage rates and injury rates in major employment categories;
- 46) Viability and adaptability to changing economic conditions;
- 47) Area and percent of forest land used for subsistence purposes

Legal, institutional, and economic framework for forest conservation and sustainable management

Legal Framework:

- 48) Clarifies property rights, provides for appropriate land tenure arrangements, recognizes customary and traditional rights of indigenous people, and provides means of resolving property disputes by due process;
- 49) Provides for periodic forest-related planning, assessment, and policy review;
- 50) Provides opportunities for public participation in public policy and decision-making related to forests and public access to information;
- 51) Encourages best practice codes for forest management;
- 52) Provides for the management of forests to conserve special environmental, cultural, social and/or scientific values;

Institutional Framework:

- 53) Provide for public involvement activities and public education, awareness, and extension programs;
- 54) Undertake and implement periodic forest-related planning, assessment, and policy review;
- 55) Develop and maintain human resource skills across relevant disciplines;
- 56) Develop and maintain efficient physical infrastructure to facilitate the supply of forest products and services;
- 57) Enforce laws, regulations and guidelines;

Economic Framework:

- 58) Investment and taxation policies and a regulatory environment which recognize the long-term nature of investments and permit the flow of capital in and out of the forest sector;
- 59) Non-discriminatory trade policies for forest products;

Capacity to Measure and Monitor Changes:

- 60) Availability and extent of up-to-date data and statistics;
- 61) Scope, frequency, and statistical reliability of forest inventories, assessments, monitoring and other relevant information;
- 62) Compatibility with other countries in measuring, monitoring, and reporting on indicators;

Research and Development:

- 63) Development of scientific understanding of forest ecosystem characteristics and functions;
- 64) Development of methodologies to measure and integrate environmental and social costs and benefits into markets and public policies;
- 65) New technologies and the capacity to assess the socio-economic consequences associated;
- 66) Enhancement of ability to predict impacts of human intervention on forests;
- 67) Ability to predict impacts on forests of possible climate change.



Glossary

actual growth: The net increase of timber growing stock volume between two measurement periods.

afforestation: The establishment of a forest in an area where preceding vegetation or land was not forest (Helms, 1998).

age class: one of the intervals into which the age range of trees is divided for classification e.g. 10 years age class.

agriculture: A management landscape class where the primary use is agriculture (crops, orchards, vineyards, irrigated pastures, and other farming activities). Human impact on natural ecological processes is significant, but presumed to retain some habitat value for some native species.

animal unit month: The amount of forage needed by an “animal unit” (AU) grazing for one month. The animal unit in turn is defined as one mature 1,000-pound cow and calf.

APHIS: Animal and Plant Health Inspection Service.

AUM: See animal unit month.

BDT: See bone dry ton.

beef cattle farms excluding feedlots: Cattle farms classified by the National Agricultural Statistical Service excluding principle crop farms with cattle and cattle feedlots.

biological diversity: The variety of life over some spatial unit; The broadly diverse forms into which organisms have evolved and is considered at three levels: genetic, species, and ecosystem.

biological legacy: A biologically derived structure or one component inherent from a previous ecosystem including large trees, snags, or down logs (Helms, 1998).

biomass: Plant material that can be converted into fuel.

bioregion: An area that includes a rational ecological community with characteristic physical (climate, geology), biological (vegetation, animal), and environmental conditions.

BLM: U.S. Bureau of Land Management.

BMP: Best Management Practice.

the Board: See BOF.

BOF: California State Board of Forestry and Fire Protection.

bone dry ton: A bone dry ton is that quantity of material that would weigh 2,000 pounds when dry.

boxed-beef: Refers to the process whereby carcasses are butchered into individual cuts and then packed and shipped from the slaughtering plant.

browse: To feed on leaves, young shoots, and other vegetation.

bull: A sexually mature adult bovine.

calf: A sexually immature young bovine.

California Wildlife Habitat Relationship system: The California Wildlife Habitat Relationship system is a state-of-the-art classification system for California’s wildlife. CWHR contains life history, management, and habitat relationships information on 675 species of amphibians, reptiles, birds, and mammals known to occur in the State. CWHR products are available for purchase by anyone interested in understanding, conserving, and managing California's wildlife.

canopy closure: Canopy closure is measured by the ground area covered by the crowns of trees or woody vegetation as delimited by the vertical projection of crown perimeters and commonly expressed as a percent of total ground area.

carbon dioxide: A colorless, odorless, non-combustible gas, present in low concentrations in the air we breathe (about three hundredths of one percent by volume). Carbon dioxide is produced when any substance containing carbon is burned. It is also a product of breathing and fermentation. Plants absorb carbon dioxide through photosynthesis.

carbon sequestration: The ability of forests or other natural systems to “sink” or store carbon, thereby preventing it from collecting in the atmosphere as CO₂. Forests absorb carbon when they break down CO₂ during photosynthesis.

carbon sink: A carbon pool (forests and other ecosystems) that has more carbon flowing into it than flows out. Forests are the best sinks because they are the most efficient means of taking carbon out of the atmosphere and storing it for the long term.

carbon storage: The process of storing carbon in leaves, woody tissue, roots, and soil nutrients.

cattle: Domesticated bovine animals as a group regardless of sex or age, including cows, steers, bulls, and oxen.

cavity nesting: Cavity nesting birds are those that nest in

holes (cavities) in trees and are divided into two groups. Primary cavity nesters can excavate their own holes in trees and snags, while secondary cavity nesters are dependent upon natural cavities and abandoned sites excavated by primary cavity nesters.

CBC: California Biodiversity Council.

CDF: California Department of Forestry and Fire Protection.

Cdfa: California Department of Food and Agriculture.

CEQA: California Environmental Quality Act.

clearcutting: The felling of all trees in a designated area in one operation.

CO₂: See carbon dioxide.

condition class: Condition classes are a function of the degree of departure from historical fire regimes resulting in alterations of key ecosystem components such as species composition, structural stage, stand age, and canopy closure.

conifer: Trees belonging to the order Gymnospermae, comprising a wide range of trees that are mostly evergreens. Conifers bear cones and have needle-shaped or scalelike leaves. In the wood products industry the term “softwoods” refers to the conifers.

Conifer Forest: A land cover type where the overstory canopy occupied by trees of which 50 percent or more are conifers. Conifer Forests are generally located in higher elevation mountainous areas and have commonly recognized evergreen tree species such as ponderosa pine (*Pinus ponderosa*) or redwood (*Sequoia sempervirens*).

Conifer Woodland: A land cover type where the overstory canopy occupied by trees of which 50 percent or more are conifers. Conifer Woodlands are generally located on the east side of the Sierra Nevada mountains and the southern regions of the state. These woodlands are generally dominated by small, brushy trees species such as California juniper (*Juniperus californica*) or pinyon pine (*Pinus edulis*).

conservation easement: A restriction deeded to a qualified third party that permanently limits certain activities on real property, in order to protect conservation values such as biodiversity, water quality, wildlife habitat, or carbon sequestration. The restriction stays with the property through successive owners. The restriction reduces the “highest and best” economic use of the property so that the property’s value reflects only the allowed uses. If the

landowner donates the easement as a gift, this reduction becomes a charitable tax deduction. An easement also can be sold to non-profit or government agencies to provide revenue.

County-based bioregion: Geographic grouping of counties based county administrative boundaries and grouped with respect to common environmental, economic, and physical conditions.

CWE: Cumulative Watershed Effects.

CWHR: See California Wildlife Habitat Relationship.

DBH: See diameter at breast height.

Desert: A land cover type including Desert Shrub and Desert Woodland land cover types. Includes shrub vegetation in arid portions of the State, with greater than two percent vegetation, scattered assemblages of a wide variety of shrub species, and tree vegetation in arid portions of the State, with greater than two percent ground cover and the presence of desert tree species such Joshua tree (*Yucca brevifolia*) and California fan palm (*Washingtonia filifera*).

developed land: An NRI definition comprising large urban and small built-up areas, as well as roads and railroads not included in urban/built-up areas.

development: A human settlement pattern having a density of more than one housing unit per 20 acres.

diameter at breast height: Tree trunk diameters measured at breast height, defined as the diameter of the tree 4.5 feet (1.37 meters) above ground on the uphill side of the tree.

disturbance regime: A natural or human caused event like floods, fire, and storms that shape vegetative composition and seral stage.

down logs: Portions of trees that have fallen to the ground that are at least 10 feet long and at least 10 inches in diameter as measured on the large end.

easement: A right, such as a right of way, to make limited use of another’s real property.

ecological integrity: A qualitative description of an ecosystem, or natural community, where the components (types of species, soil etc.), structures (arrangement of components), and processes (flows of energy and nutrients) are highly maintained and intact. Lands with ecological integrity generally have not been subjected to significant human influences or disruption of natural pro-



Glossary

cesses, such as fire, floods, and nutrient and hydrological cycling.

ecosystem: The interacting system of a biological community and its nonliving environmental surroundings.

ecosystem health: A biological community and its nonliving environmental surroundings functioning within a normal range of variability; The capacity to maintain ecosystems structures, functions and capabilities to provide for human need.

ecosystem function: The operational role of ecosystem components, structure, and processes.

ecosystem processes: The flow or cycling of energy, materials, and nutrients through space and time.

ecosystem services: The beneficial outcomes, for the natural environment, or for people, that result from ecosystem functions. Some examples of ecosystem services are support of the food chain, harvesting of animals or plants, clean water, or scenic views. In order for an ecosystem to provide services to humans, some interaction with, or at least some appreciation by, humans is required.

ecosystem structure: Spatial distribution or pattern of ecosystem components.

endangered species: Any species, including subspecies or qualifying distinct population segment, which is in danger of extinction throughout all or a significant portion of its range.

EPA: U.S. Environmental Protection Agency.

ESU: See evolutionary significant unit.

evenaged stand: A forest stand or forest type in which relatively small (10–20 year) age differences exist between individual trees. Evenaged stands are often the result of fire, or a harvesting method such as clear-cutting or the shelterwood method; Forest stand where more than 70 percent of the tree stocking falls within three adjacent, decadal, age classes.

exotic or non-native species: A species of plant or animal introduced from another country or geographic region outside its natural range (Helms, 1998).

extirpation: Driven out or eliminated from an area.

feedlots: A plot of ground on which livestock are fattened for market.

FIA: See Forest Inventory and Analysis.

fire exclusion: The lack of natural or man-caused forest

fires due to wildfire suppression activities.

fire frequency: A broad measure of the rate of fire occurrence in a particular area. For historical analyses, fire frequency is often expressed using the fire return interval calculation, whereas in the modern-era where data on timing and size of fires are recorded, fire frequency is often best expressed using fire rotation.

fire regime: A measure of the general pattern of fire frequency and severity typical to a particular area or type of landscape. The regime can include other metrics of the fire, including seasonality and typical fire size, as well as a measure of the pattern of variability in characteristics.

fire rotation: An area-based average estimate of fire frequency, calculated as the length of time necessary for an area equal to the total area of interest to burn. Fire rotation is often applied to regionally stratified land grouping where individual fire-return intervals across the variability of the strata (i.e., the fine scale pattern of variation in timing of fires) is unknown, but detailed information on fire size is known. Hence, fire rotation is a common estimate of fire frequency during periods of recorded fire sizes.

fire threat: An index of expected fire frequency and physical ability to cause impacts. Components include surface fuels, topography, fire history, and weather condition.

FishNet4C: Fishery Network of Central California Coastal Counties.

FMD: See Foot-and-Mouth Disease.

Foot-and-Mouth Disease: Foot-and-Mouth Disease is a highly contagious and economically devastating disease of cattle and swine. It also affects sheep, goats, deer, and other cloven-hooved ruminants.

forage: All browse and herbage that is available and acceptable to grazing animals.

forb: A broad-leaved herb other than a grass, especially one growing in a field, prairie, or meadow.

forest/forests: A biological community of plants and animals that is dominated by trees and other woody plants; Lands with great than 10 percent tree canopy cover; All habitats in the Conifer and Hardwood land cover categories.

forest and rangeland: Specific habitats in the Conifer, Hardwood, Shrub, Grassland, and Desert and some Wetland (Wet Meadow) land cover types excluding Urban, Agriculture, Barren, and Water categories.

forest health: A condition where a forest has the capacity for renewal, for recovery from a wide range of disturbances, and for retention of ecological function, while meeting the current and future needs of people for desired levels of values, uses, products, and services (Dahms and Geils, 1997).

Forest Industry: Lands owned by companies that grow timber for industrial use. Includes companies both with and without wood processing plants; An ownership class in the USDA FS PNW Experiment Station Forest Inventory and Analysis program.

Forest Inventory and Analysis: Forest land and timberland statistics reported by the Pacific Resource Inventory, Monitoring and Evaluation program (PRIME) of PNW. Every decade, PRIME conducts the Forest Inventory and Analysis, which is a national mandate authorized by the Forest and Rangeland Renewable Resource Research Act of 1978. The FIA is a plot-based survey and statistical analysis with representative field based plots of all forest lands outside the National Forest System.

forest structure: the horizontal and vertical distribution of components of a forest stand including height, diameter, crown layers, and stems of trees, shrubs, herbaceous understory, and downed woody debris (Helms, 1998).

formal list or formally listed: A State and federally regulatory list of animals and plants considered endangered, threatened, or rare pursuant to the Native Plant Protection Act of 1977, California Endangered Species Act of 1984, and/or federal Endangered Species Act of 1973.

FPR: Forest Practice Rule.

fragmentation: The process by which a landscape is broken into smaller islands of forests within a mosaic of other forms of land use ownerships e.g., islands of a older particular age class that remain within areas of younger, aged forest (Helms, 1998).

FRAP: Fire and Resource Assessment Program.

FSC: Fire Safe Council.

FWS: U.S. Fish and Wildlife Service.

GAP: Gap Analysis Program.

Geographic Information System: A computer based system used to store and manipulate geographical (spatial) information.

geothermal: Natural heat from within the earth, captured for production of electric power, space heating, or

industrial steam.

GIS: See Geographic Information System.

Grassland: Lands on which the vegetation is dominated by grasses, grasslike plants or forbs; A land cover class with greater than two percent grass cover but less than ten percent tree or shrub cover.

grazing capacity: Maximum stocking rate possible without damage to vegetation or related resources.

grazing permit: Land lease offering written permission to graze a specific number, kind, and class of livestock for a specified defined allotment.

gross state product: Gross output (sales, receipts and other operating income, commodity taxes, and inventory changes) minus intermediate inputs (consumption of goods and services purchased from other U.S. industries or other nations).

GSP: see gross state product.

growing stock volume: Net volume (gross volume less deductions for defect) of live trees greater than 5 inches dbh from stump to a four inch top.

habitat: A unit in the environment natural or otherwise where an animal, plant, or population naturally or normally lives and develops; a specific land cover subclass classified by the California Wildlife Habitat Relationship System.

habitat quality: A subjective term used to describe the condition of a specific habitat and its ability to support a species.

hardwoods: Dicotyledonous trees; trees that are generally deciduous, broad-leaved species such as oak, alder, or maple.

Hardwood Forest: A land cover type with greater than ten percent of the overstory canopy occupied by trees of which 50 percent or more are hardwood trees such as black oak (*Quercus kelloggii*), canyon live oak (*Quercus chrysolepis*), tanoak (*Lithocarpus densiflorus*) and madrone (*Arbutus menziesii*). Hardwood Forests are usually located in the mountainous elevations above the Woodlands and are often associated with Conifer Forest tree species.

Hardwood Woodland: A land cover type with greater than 10 percent tree cover of which greater than 50 percent are hardwood trees. Different from Hardwood Forest, trees are widely spaced, shorter stature and often found in the lower elevations in the transition between grasslands/shrub and conifer forests. Hardwood Wood-



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lands are very extensive throughout California and are found in many different lower elevation mountainous areas with both evergreen and deciduous tree species. In the Sierra Nevada range, tree species typically include blue oak (*Quercus douglasii*) and interior live oak (*Quercus wislizenii*). In the northern coastal ranges, tree species include black oak (*Quercus kelloggii*), and canyon live oak (*Quercus chrysolepis*). In the mid to southern coast range species include coast live oak (*Quercus agrifolia*) and California bay (*Umbrellula californica*) and further south, Englemann oak (*Quercus englemanni*). Typical understory is composed of extensive annual grass vegetation.

HCP: Habitat Conservation Plan.

herbaceous: Refers to a plant that has a non-woody stem such as forbs, grasses and ferns.

hydroelectric: A technology that produces electricity from falling water that turns a turbine generator, referred to as hydro. See also small hydro.

impaired: Condition of the quality of an ecosystem or habitat that has been adversely affected for a specific use by contamination or pollution.

invasive species: A species of plant or animal that is able to proliferate and alter native biological communities and ecosystem function.

land cover: Predominant vegetation life forms, natural features, or land uses that occupy a land area.

land trust: A private, non-profit organization formed to protect natural resources such as wildlife habitat, prime farmland, and recreational lands. It accomplishes this through a variety of means, including outright purchase, securing donations, and receiving conservation easements.

Late Succession Forest: A regulatory term defined by the California Forest Practice Rules where stands of dominant and predominant trees meet the criteria of CWHR class 5M, 5D, and 6 with open, moderate or dense canopy classification, often with multiple canopies and are at least 20 acres in size. Characteristics include large decadent trees, snags and large down logs.

late successional: Life stage of vegetations where plant communities are in a stable state reflective of increased age.

litter: The uppermost layer of the forest floor consisting chiefly of fallen leaves and other decaying organic matter.

livestock: Domestic animals, such as cattle or horses,

raised for home use or for profit, especially on a farm.

LSF: Late Succession Forest. A regulatory term for forests with characteristics of CWHR 5, 6 MD, 20 forest stand size minimum, and containing snags and down logs.

LWD: Large woody debris.

Management Landscape: A conceptual framework developed by FRAP which classifies lands based on the primary land use objective, ownership status, and population density.

Management Landscape class: One of eight unique management landscape classifications that describe areas with similar land use objectives, ownership status, or housing unit density. Each class shares similar administrative, regulatory, and legal frameworks.

Management Landscape Map: Depicts the geographic distribution of land use objectives, ownership, and population density.

megawatt: One thousand kilowatts; one megawatt is about the amount of power to meet the peak demand of a large hotel.

metropolitan forest: Forest areas within six miles of urban areas with greater than 10 percent tree canopy.

Montréal Process: A scientifically rigorous set of criteria and indicators used to measure forest management and sustainability.

MSG: Monitoring Study Group.

national forest: Federal lands that have been designated by Executive Order or statute as national forest or purchase units and other lands under the administration of the U.S. Forest Service (U.S. Department of Agriculture).

native species: A species of plant or animal present prior to European settlement.

NASS: National Agriculture Statistics Service.

native surface road: a dirt surfaced road with no applied paving or gravel.

NCCP: Natural Community Conservation Planning.

NCWAP: North Coast Watershed Assessment Program.

neotropical migrant: Refers to bird species that nest in temperate regions and migrate to the neotropical faunal region, which includes the West Indies, Mexico, Central America, and that part of South America within the tropics.

NMFS: National Marine Fisheries Service.

non-attainment status: A pollutant is designated non-attainment if there was at least one violation of a state standard for that pollutant in the area.

non-native species: see exotic.

nonpoint: Pollution whose source cannot be ascertained including runoff from storm water and agricultural, range, and forestry operations, as well as dust and air pollution that contaminate waterbodies.

NO_x: A general group of nitrogen compounds often termed oxides of nitrogen.

NPS: National Park Service.

NRCS: U.S. Natural Resources Conservation Service.

nutrient cycling: The exchange or transformation of elements among the living and nonliving components of an ecosystem.

O₃: See ozone.

OHV: Off highway vehicles.

old growth forest: A subjective description of a stand or stands of forest trees that exhibits large tree sizes, relatively old age, and decay characteristics common with over-mature trees; As defined by USDA FS ecologists, specific forest structure characteristics, by forest type and site class, such as size of trees, number of trees per acre, multiple canopies, degree of decay, and size and number of snags and down woody debris.

open-cup nesting: Refers to bird species that construct nests on the ground or in a shrub or tree that is shaped like a cup and accessed from the top.

open forest stand: A forest condition where large, old trees exist within a mosaic of open grasslands.

open space: Land free from intensive residential or commercial uses.

other private: Private lands not owned by forest industry; an ownership class in the USDS FS PNW Experiment Station Forest Inventory and Analysis program.

other public: An ownership class that includes all public lands except National Forests; an ownership class in the USDA FS PNW Experiment Station Forest Inventory and Analysis program.

ozone: An unstable, poisonous allotrope of oxygen that is

formed naturally from atmospheric oxygen by electric discharge or exposure to ultraviolet radiation. It is also produced in the lower atmosphere by the photochemical reaction of certain pollutants.

parcelization: The process of land ownership being broken into increasingly smaller tracts.

particulate matter: Airborne particles 10 microns in diameter and smaller.

perennial: A plant which lives or continues over two years, whether it retains its leaves in winter or not.

PM10: Particulate matter 10 microns or greater in diameter.

prescribed fire: A deliberate burn of wildland fuels in either their natural or modified setting and under specific environmental conditions which allow the fire to be confined to a predetermined area and intensity to attain of planned resource management objective (Helm, 1998).

productive capacity: The ability of an ecosystem to produce the raw materials necessary for economic activities. These materials include all renewable resources found both on and below the surface of the ecosystem such as agricultural products, fibers, foodstuffs, timber, water, etc.

potential growth: The theoretical periodic volume growth of trees based on the inherent productivity (site class) of the soil.

Public: Lands owned by local, state, or federal government, or special districts.

Private: Lands not publicly owned, including private conservancy lands.

Rangeland: Any expanse of land not fertilized, cultivated or irrigated that is suitable, and predominately used for, grazing by domestic livestock and wildlife. These include the Conifer Woodland, Hardwood Woodland, Shrub, Grassland, Desert land cover types along with and some habitats within the Wetland and Hardwood Forest land cover classes.

renewable: A power source other than a conventional power source within the meaning of Section 2805 of the Public Utilities Code, provided that a power source utilizing more than 25 percent fossil fuel may not be included.

Reserve: A management landscape class where lands are



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permanently protected from conversion of natural land cover and having a mandated management plan in operation to maintain a primarily natural state, but which may receive management practices; lands managed consistent with statutory designation such as wilderness, wild and scenic, national park, and nation monument.

riparian: Relating to or located on the banks of a river or stream.

riparian area: Transition zone between a stream's edge and the dryer uplands.

Rural Residential: A Management Landscape class where with housing densities greater than one unit per 20 acres (greater than 32 units per square mile) and less than one unit per acre.

RVD: Recreational visitor day.

RWQCB: Regional Water Quality Control Board.

salmonids: Salmon species.

seed tree: The cutting method (in silvicultural) where all trees are removed except for a small number of seed bearers left singly or in small groups, maybe 10 per acre. The seed trees are generally harvested after regeneration is established. An evenaged stand results.

SFI: Sustainable Forest Initiative.

shelterwood: A silvicultural method to establish seedling regeneration via a series of partial harvests, followed by the almost complete removal of overstory trees in a removal harvest once adequate numbers of seedlings are in place to permit the seedlings to grow in full sunlight.

Shurb: A land cover class with greater than ten percent shrub cover and less than ten percent tree cover.

Significant (fire threat) risk: Those lands exposed to Very High or Extreme fire threat.

silviculture: Generally, the science and art of cultivating (such as with growing and tending) forest crops, based on the knowledge of silvics. More explicitly, silviculture is the theory and practice of controlling the establishment, composition, constitution, and growth of forests.

size class: an internal into which a measurement of the trees' trunk diameters at breast height (DBH) is divided for classification e.g., two-inch size classes.

small hydro: A facility employing one or more hydroelectric turbine generators, the sum capacity of which does not exceed 30 megawatts.

snags: Standing dead trees with a minimum DBH of 10 inches and a height of 10 feet.

SOD: Sudden Oak Death.

Sparsely Populated: A component of Management Landscape classes describing housing unit densities of less than one housing unit per 20 acres.

Special Management Zone: Forest and rangelands where specific regulatory requirements or lands of particular concern under the Forest Practice Rules dictate the intensity and type of land use management permitted.

stand: A group of trees sufficiently uniform in composition, age, and/or condition forming a management entity and distinguishable from adjoining tree groups.

Standard Industrial Classification: A numerical system for categorizing industrial sectors, used in the U.S. until 1997.

stocking level: A measure used to determine how much wood fiber is growing in a standing timber acre.

succession: Process of vegetational development whereby an area becomes successively occupied by different plant communities of higher ecological order.

successional stage: A particular state of ecological development.

sudden oak death: a brown alga species, *Phytophthora ramorum*, that infects a variety of host species, including several coastal oak species.

sustainability: Meeting the needs of the present without compromising the ability of future generations to meet their own needs.

SWRCB: California State Water Resources Control Board.

T&E: Threatened and Endangered Species.

THP: Timber Harvesting Plan.

threatened species: Any species that is likely to become endangered within the foreseeable future throughout all or a significant portion of its range.

Timberland Production Zone: A statutory designation for lands assessed for taxes based on growing and harvesting timber as the highest and best use of the land.

timberland: Forest land capable of growing 20 cubic feet or more of industrial wood/acre/year (mean increment at

culmination in fully stocked, natural stands). Timberland is not in a reserved status through removal of the area from timber utilization by statute, ordinance, or administrative order and is not in a withdrawn status pending consideration for reserved.

TMDL: See Total Maximum Daily Load.

Total Maximum Daily Load: A calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards, as well as an estimation of the percentage originating from each pollution source. A TMDL is the sum of the allowable loads of a single pollutant from all contributing point and non-point sources. The calculation must include a margin of safety to ensure that the waterbody can be used for State-designated purposes. The calculation must also account for seasonal variation in water quality.

TPZ: See Timberland Production Zone.

transfer payments: Income payments to persons for which no current services have been performed. They consist of payments to individuals and to non-profit institutions by businesses and federal, state, and local governments.

turbidity: The relative clarity of water, that may be affected by material in suspension in the water.

UC: University of California.

UCCE: University of California Cooperative Extension.

understory: The trees and other woody species growing under a relatively continuous cover of branches and foliage formed by the overstory trees.

unevenaged: Silvicultural system in which individual trees originate at different times and result in a forest with trees of many ages and sizes; stands where less than 70 percent of the tree stocking falls in three adjacent 10 year age classes.

unsuitable: Lands that are not in a reserved status through removal of the area from timber utilization by statute, ordinance, or administrative order, but in practice or as prescribed in management plans or regulatory rules are not primarily managed for timber production.

Urban: A land cover class and Management Landscape class having housing densities greater than one unit per acre or classified as commercial/industrial/transportation. Human impact on natural ecological processes is significant.

USFS: U.S. Forest Service.

value-added: Of or relating to the estimated value that is added to a product or material at each stage of its manufacture or distribution.

Variable retention: A silvicultural approach to harvesting based on retention of structural elements or biological legacies from the harvested stand for integration into a new stand to achieve various ecological objectives (Helms, 1998).

viewshed: The total area visible from a point (or series of points along a linear transportation facility). Viewshed is typically evaluated both from the roadway and conversely of the roadway as viewed from the adjacent area.

watershed: The land area drained by a particular stream course.

Wetland: An aquatic (water dominated) land cover type having greater than two percent vegetation cover and having less than 10 percent of the over story canopy occupied by trees or shrubs.

wildfire: Any fire occurring on undeveloped land; the term specifies a fire occurring on a wildland area that does not meet management objectives and thus requires a suppression response. Wildland fire protection agencies use this term generally to indicate a vegetation fire. Wildfire often replaces such terms as forest fire, brush fire, range fire, and grass fire.

wildland: A region with minimal development as evidenced by few structures; transportation networks may traverse region. Region typically contains natural vegetation and may be used for recreational or agricultural purposes.

wildland urban interface: The geographical meeting point of two disparate systems, wildland and structures. At this interface, structures and vegetation are close enough that a wildland fire could spread to structures or fire could spread from structures to ignite vegetation.

woody debris: Fallen dead wood or large branches; an important source of nutrients and habitat. Woody debris is also a source of fuel for fire.

woody plant: A plant having hard lignified tissues or woody parts especially stems.

Working: Lands held or managed for some degree of commodity output, usually range or forested lands. Human impact is measurable and definite yet there remains considerable habitat value for native species.

WUI: See wildland urban interface.

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County Land Cover Area

Table A-1. County land cover area (thousands of acres)

County	Conifer Forest	Conifer Woodland	Hardwood Forest	Hardwood Woodland	Shrub	Grassland	Desert Woodland	Desert Shrub	Wetland	Agriculture	Barren/Other	Urban	Water	Grand Total
Alameda	4		18	64	35	154			4	14	(L)	174	8	477
Alpine	238	17	4		116	11			2	5	74	1	4	474
Amador	121		71	50	25	78			1	11	11	10	8	387
Butte	310		102	122	34	139			18	269	5	48	27	1,073
Calaveras	261		102	57	73	143			(L)	1	3	5	17	663
Colusa	35		30	93	97	110			19	340	1	9	7	740
Contra Costa	2		2	37	36	155			7	65	(L)	156	13	475
Del Norte	439		110	(L)	65	4			1	11	6	9	5	649
El Dorado	634		151	48	96	76			8	8	31	39	55	1,146
Fresno	810	2	105	316	176	529		2	20	1,390	319	140	42	3,852
Glenn	89		46	77	111	216			11	277	5	9	9	849
Humboldt	1,343		518	33	56	221			9	41	28	32	10	2,293
Imperial		8			4	10	4	1,981		597	19	50	195	2,868
Inyo	64	350	15		542	(L)	47	5,022	8	2	478	7	12	6,547
Kern	154	172	63	339	394	1,345	13	1,434	9	1,080	15	183	18	5,218
Kings	(L)			10	12	209		5	3	615	(L)	34	2	890
Lake	200		117	76	294	51			1	42	2	20	49	852
Lassen	849	199	16		1,540	36		31	70	128	17	10	113	3,010
Los Angeles	92	56	71	41	807	90	4	399	(L)	91	14	850	14	2,529
Madera	348	1	87	137	54	263		(L)	5	365	81	27	10	1,378
Marin	36		41	29	37	124			6	8	3	48	5	336
Mariposa	320	1	137	133	143	165			3	(L)	20	4	7	935
Mendocino	1,055		639	28	162	277			(L)	54	9	17	6	2,248
Merced	1		2	69	8	497		1	45	575		37	25	1,261
Modoc	612	400	8		1,037	27		73	41	232	69	4	187	2,689
Mono	258	231	23		897	42		226	12	51	201	5	57	2,003
Monterey	59		42	518	528	638			3	249	7	68	8	2,120
Napa	20		111	64	121	63			3	67	1	31	25	505
Nevada	347	(L)	91	36	50	31			4	5	25	24	12	623
Orange	1		2	14	134	34		(L)	1	21	2	297	4	511
Placer	445	(L)	94	66	68	102			5	45	18	57	61	960
Plumas	1,279	(L)	40		185	41			10	61	11	7	40	1,673
Riverside	54	71	20	26	747	184	29	2,645	4	390	82	361	59	4,672
Sacramento	(L)		3	21	1	203			7	212	1	170	11	628
San Benito	4	1	2	249	124	446		(L)		53	1	10	1	889
San Bernardino	183	263	47	6	490	102	37	11,004	1	98	190	401	45	12,867
San Diego	54	45	29	112	1,155	162	1	554	8	147	7	417	19	2,712
San Francisco				(L)	(L)	(L)			(L)		(L)	29	(L)	30
San Joaquin	(L)		2	27	4	170			6	607	1	82	13	912
San Luis Obispo	18	6	29	425	426	991		34	(L)	121	6	54	15	2,125
San Mateo	66		(L)	9	87	23			2	7	1	91	4	291
Santa Barbara	26	38	40	208	796	282		(L)	1	127	16	94	6	1,634
Santa Clara	51		5	192	174	152			2	50	(L)	201	6	833
Santa Cruz	138		1	10	56	14				30	(L)	36	1	285
Shasta	1,186	12	337	286	336	110			10	69	27	44	47	2,462
Sierra	408	(L)	21	(L)	124	8			4	33	10	1	6	615
Siskiyou	2,427	174	279	1	618	188		(L)	40	202	65	20	50	4,064
Solano	(L)		5	24	15	177		(L)	47	184	1	64	21	539
Sonoma	190		278	12	49	227			7	155	3	85	9	1,015
Stanislaus	1		5	100	65	320			3	400	(L)	67	9	970
Sutter			(L)	15	(L)	39			11	306	(L)	12	7	389
Tehama	447		83	430	256	499			10	131	10	18	10	1,895
Trinity	1,536	(L)	251	7	173	44			1	1	17	3	21	2,053
Tulare	840	166	158	352	179	340		(L)	19	794	185	56	11	3,098
Tuolumne	781	7	162	29	162	103			15	(L)	157	8	33	1,458
Ventura	72	144	30	53	538	65		1	1	121	24	124	6	1,179
Yolo	1		1	82	48	108			10	363	2	31	8	654
Yuba	95		46	55	3	82			4	99	2	17	10	412
California	19,004	2,363	4,691	5,188	14,565	10,919	134	23,414	540	11,421	2,283	4,909	1,486	100,915

(L) less than 500 acres

Sources: Teal Data Center Ownership (Govtown 1999) FRAP Multi source landcover data v. 02_1 (Fveg 02_1g, 2002)

Statewide Habitat Area

Table A-2. California Wildlife Habitat Relationships forest and rangeland habitat types by owner (thousand acres)

Habitats	Private	USFS	BLM	NPS	Other Public	Total
Conifer Forest						
Closed-Cone Pine-Cypress	56	50	25	12	11	155
Douglas Fir	1,323	1,726	163	21	102	3,335
Eastside Pine	443	929	40	(L)	8	1,420
Jeffrey Pine	38	409	8	109	6	570
Klamath Mixed Conifer	340	1,011	16	9	6	1,381
Lodgepole Pine	35	310	(L)	245	1	591
Montane Hardwood-Conifer	723	801	41	11	49	1,626
Ponderosa Pine	424	369	38	62	13	906
Red Fir	117	998	(L)	296	2	1,414
Redwood	1,079	5	1	45	167	1,297
Sierran Mixed Conifer	1,598	2,912	48	131	44	4,734
Subalpine Conifer	17	495	6	121	4	642
White Fir	153	628	2	38	4	826
Unclassified Conifer	85	1	6	6	10	107
Total	6,432	10,644	394	1,108	426	19,004
Conifer Woodland						
Juniper	339	317	234	66	59	1,015
Pinyon-Juniper	119	734	249	154	92	1,348
Total	458	1,051	482	220	151	2,363
Hardwood Woodland						
Blue Oak-Foothill Pine	754	39	121	17	49	979
Blue Oak Woodland	2,457	129	104	9	120	2,819
Coastal Oak Woodland	832	138	12	8	104	1,095
Eucalyptus	9	(L)	(L)	(L)	1	11
Valley Foothill Riparian	114	4	2	1	27	147
Valley Oak Woodland	126	1	2	(L)	9	137
Total	4,292	310	239	36	309	5,188
Hardwood Forest						
Aspen	3	32	1	2	1	40
Montane Hardwood	2,797	1,215	174	89	165	4,439
Montane Riparian	100	40	1	43	27	211
Total	2,901	1,287	176	134	193	4,691
Shrub						
Alpine Dwarf Shrub	1	201	(L)	18	(L)	219
Bitterbrush	81	162	25	26	5	299
Chamise-Redshank Chaparral	671	399	187	12	114	1,383
Coastal Scrub	1,175	218	74	28	235	1,730
Low Sagebrush	19	151	48	1	11	230
Mixed Chaparral	1,813	2,152	457	16	301	4,739
Montane Chaparral	369	1,032	23	43	14	1,481
Sagebrush	880	1,347	1,407	168	174	3,976
Unclassified Shrub	426	12	40	8	24	509
Total	5,433	5,673	2,261	319	878	14,565
Grassland						
Annual Grassland	9,592	233	496	38	494	10,852
Perennial Grassland	30	(L)	(L)	4	32	67
Total	9,621	233	496	43	526	10,919
Desert Shrub						
Alkali Desert Scrub	630	70	1,184	470	648	3,003
Desert Riparian	15		18	3	11	47
Desert Scrub	3,348	126	8,326	4,136	3,099	19,036
Desert Succulent Shrub	115		216	17	156	503
Desert Wash	164	(L)	471	33	204	872
Total	4,272	197	10,216	4,659	4,117	23,461
Desert Woodland						
Joshua Tree	27	3	34	18	2	84
Palm Oasis	(L)		3		(L)	3
Total	27	3	37	18	2	87
Wetland						
Wet Meadow	145	69	11	20	23	268
Total	33,582	19,468	14,312	6,558	6,626	80,545



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Mary Heim, Demographic Research Unit Chief

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Tom Blankenship, Senior Wildlife Biologist
Ron Jurek, Habitat Conservation Planning Branch
Rick Mayfield, Wildlife Biologist
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California Department of Food and Agriculture

Patrick Akers, Integrated Pest Control
Seth Hoyt, California Agricultural Statistics Service

California Department of Forestry and Fire Protection

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Shane Cunningham, Review Team Chair, North Zone Operations
Helge Eng, Forest Practice
Shana Jones, Resource Management
John Munn, Forest Practice;
Jesse Rios, Forest Health Monitoring
Doug Wickizer, Environmental Protection and Regulation

California Department of Parks and Recreation

Keith Demetrak, Planning Division Chief

California Department of Water Resources

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California Environmental Protection Agency Office of Environmental Health Hazard Assessment

Linda Mazur, Staff
Carmen Milanes, Supervisor
Barbara Shayne Washburn, Toxicologist

California Forestry Association

Phil Aune, Vice President for Public Resources

California Legacy Project

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California Legacy Project
Luree Stetson, Assistant Secretary
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California Native Plant Society

David Tibor, Rare Plant Biologist

California Research Bureau

Daniel Pollak, Senior Policy Analyst

California Resources Agency, Office of the Secretary

Greg Greenwood, Deputy Assistant Secretary

California State Board of Equalization

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Ken Fulgham, Professor, Rangeland Resources

California State University, Sacramento

Dr. Cary Goulard, retired
Greg Shaw, Department of Recreation and Leisure Studies

Governor's Office of Planning and Research

Terry Roberts, State Clearinghouse Director

Oregon Department of Forestry

James E. Brown, Oregon State Forester, retired
Kevin Birch, Forester

State Water Resources Control Board

Margie Read, Nonpoint Source Program Implementation
Nancy Richard, Surface Water Regulatory Branch
Dominic Roques, Engineering Geologist, Central Coast
Regional Water Quality Control Board

The Pacific Forest Trust

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Laurie A. Wayburn, Co-Founder and President

U.S. Department of Agriculture, Economic Research Service

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U.S. Department of Agriculture Natural Resources Conservation Service

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Ken H. Cordell, Recreation, Wilderness, Urban Forest and Demographic Trends Research

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Chris Feddersen, Office Manager

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Mike Byrne, Information Center for the Environment

Mel George, Ph.D., Agronomist

Neil McDougald, Area Watershed Advisor

W.M. Beaty & Associates

Lennart Lindstrang, Jr., Land Department Manager

The Management Landscape
Wildlife Habitats
Historical and Projected Development
Fire Threat



Castle Crag Wilderness Area, Humboldt County